

Remarks/Arguments

Favorable consideration of this application as presently amended and in light of the following discussion is respectfully requested.

Claims 3, 4, and 11 are pending in the application, with Claims 3, 4, and 11 amended and Claims 1, 2, 5-10, and 12-17 cancelled by the present amendment.

In the outstanding Office Action, Claims 1 and 11 were rejected under 35 U.S.C. § 102(b) as being anticipated by Ishii et al. (U.S. Patent No. 5,571,366, hereinafter Ishii); Claims 1 and 11 were rejected under 35 U.S.C. § 102(e) as being anticipated by Lee et al. (U.S. Patent No. 6,288,493, hereinafter Lee); Claim 4 was rejected under 35 U.S.C § 103(a) as being unpatentable over Lee; Claim 3 was rejected under 35 U.S.C § 103(a) as being unpatentable over Lee in view of Holland et al. (U.S. Patent No. 5,800,619, hereinafter Holland); Claim 4 was rejected under 35 U.S.C § 103(a) as being unpatentable over Ishii; and Claim 3 was rejected under 35 U.S.C § 103(a) as being unpatentable over Ishii in view of Holland.

Applicants acknowledge with appreciation the personal interview between the Examiner and Applicants' representative on October 28, 2003. During the interview, Applicants' representative noted that Holland does not teach parallel coil planes while Applicants' coil planes are parallel. The Examiner acknowledged that Holland does not teach parallel coils but further noted that, this feature was not recited in the Claims presented in Applicants' response of October 23, 2003. Thus, while agreement was not reached, Applicants were encouraged to submit a substitute response under 37 C.F.R. § 1.116 to take the place of the response filed on October 23, 2003, so as to present amendments to Claims 3 and 11 that clearly recite that the coil planes are parallel.

As suggested by the Examiner in the interview of October 28, 2003, Claim 3 is amended to recite that the at least one coil is disposed on a plane parallel to a common plane of coils. Claim 4 is amended to depend from independent Claim 3. Independent Claim 11 is amended to recite the power supply antenna features of Claim 3. No new matter is added.

In view of the cancellation of Claim 1 and the amendments to Claims 4 and 11, the outstanding rejections of Claims 1, 4, and 11 are moot.

Briefly recapitulating, Claim 3 is directed to a power supply antenna, comprising a plurality of coils disposed concentrically, the plurality of coils being prepared by bending a plurality of conductors each into a form of an arc. Power supply portions, formed at opposite ends of the respective coils so as to be connected to a high frequency power source, are located in different phases on a same plane. At least one of the coils is disposed on a plane parallel to the same plane and is configured to vary mutual inductances so that a distribution of energy absorbed in a plasma is adjusted. The claimed antenna provides a strong plasma distribution in the form of a doughnut below the antenna coils. By placing at least coil in a parallel plane, heating distribution of the plasma can be shaped to achieve a uniform absorption distribution and/or intensification.¹

Ishii discloses an antenna comprising divisional antennas and designed to decrease plasma density in the central portion of the antenna and uniformize plasma density in the radial direction as compared with a spiral coil.² However, as noted in the Official Action,³ Ishii does not teach or suggest “at least one of the coils is disposed on a plane [parallel to] the

¹ Specification, page 26, lines 13-20.

² Ishii, abstract.

³ Official Action, page 7, lines 14-20.

same plane and is configured to vary mutual inductances so that a distribution of energy absorbed to a plasma is adjusted.”

Lee discloses an antenna device with two coaxial coil antennas. However, as noted in the Official Action,⁴ Lee does not teach or suggest “at least one of the coils is disposed on a plane [parallel to] the same plane and is configured to vary mutual inductances so that a distribution of energy absorbed to a plasma is adjusted.”

Holland teaches an “electric source [including a] substantially planar coil 24, usually mounted immediately above window 19”⁵ and alternative embodiments that include “positioning the coils... in many different planes above window 19.”⁶ However, Holland does not teach or suggest that “at least one of the coils is disposed on a plane parallel to the same plane” as recited in Applicants’ Claims 3 and 11. Applicants also note that Holland teaches that the antenna structure of Holland generates a nonuniform component is generated in the plasma within the chamber 10 mounted in a direction parallel to the dielectric window 19.⁷ Thus, Holland states that the most uniform plasma is generated when the inclination angle between the coil plane and the window 19 is set at about 9 to 18 degrees.⁸ However, with Applicants’ claimed “at least one of the coils...disposed on a plane parallel to the same plane,” the nonuniform component of Holland is not generated. Thus, with Applicants’ claimed invention, there is no need to provide a coil inclination to maintain plasma stability.

Holland also does not teach that the coil on the parallel plane “is configured to vary mutual inductances so that a distribution of energy absorbed to a plasma is adjusted” as recited in Applicants’ Claim 3. In Applicants’ invention, the respective coils are arranged

⁴ Official Action, page 6, lines 11-15.

⁵ Holland, column 7, lines 2-8.

⁶ Holland, column 14, lines 11-24.

⁷ Holland, column 13, lines 10-20

⁸ Holland, column 13, lines 21-45; Figure 10.

parallel to one another with an adjustable vertical distance L between the coils so as to vary mutual inductances so that the distribution of energy absorbed to the plasma is adjusted. By being able to vary mutual inductances (by adjusting a distance L between the coils), an optimum energy distribution can be obtained in an improved and easy-to-control manner. Additionally, antenna coils are generally made of a hard material, such as a copper pipe. Thus, once the antenna coil is produced, it is virtually impossible to change its physical characteristics (e.g., diameter). However, with the claimed invention, desired adjustments can be made by changing the height position of a predetermined coil. In contrast, conventional systems like Holland are unable to vary mutual inductances.

Because none of the cited prior art, individually or in combination, disclose or suggest all the elements of independent Claims 1 and 11, Applicants submit the inventions defined by Claims 1 and 11, and all claims depending therefrom, are not rendered obvious by the asserted prior art for at least the reasons stated above.⁹

The present amendment is submitted in accordance with 37 C.F.R. § 1.116 which permits amendments placing the claims in better form for consideration on appeal after final rejection. Since the present amendment clarifies the claimed invention, Applicants request that 37 C.F.R. § 1.116 be liberally construed and the present amendment be entered.

⁹ MPEP § 2142 "...the prior art reference (or references when combined) must teach or suggest **all** the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991)."

Accordingly, in view of the present amendment and in light of the previous discussion, Applicants respectfully submit that the present application is in condition for allowance and respectfully request an early and favorable action to that effect.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.



Eckhard H. Kuesters
Attorney of Record
Registration No. 28,870
Michael E. Monaco
Registration No. 52,041

Customer Number
22850

Tel.: (703) 413-3000
Fax: (703) 413-2220
EHK/MEM/kkn

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